

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Inventor(s): Brian J. Schwartz et al.
Assignee: United Technologies Corp.
Title: COOLANT NOZZLE

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Appeal Brief under 37 CFR 41.37(c)(1)

This Appeal Brief is submitted in support of the Notice of Appeal which was filed on February 28, 2007. The time for response was extended from April 28, 2007 to May 19, 2007 by the April 19, 2007 Decision. Accordingly Appellants request an extension of time for filing the present Appeal Brief, and believe that a one-month extension is sufficient.

(i) ***Real party in interest*** - The real party in interest for this Appeal is the Assignee of Record, United Technologies Corporation.

(ii) ***Related appeals and interferences*** – There are no known related interferences and no other related appeals.

(iii) ***Status of claims*** - The claims are as listed in the amendment mailed April 20, 2006 and as set forth in the accompanying Appendix. Claims 1-8, 10, 11, 13-16, and 18-26 were pending in the application. Claims 1-8, 10, 11, 13-16, and 18-26 were rejected. No claims were merely objected to and no claims were allowed. Claims 1-8, 10, 11, 13-16, and 18-26 are on appeal.

(iv) ***Status of amendments*** – No amendments were filed after the rejection made final dated November 29, 2006 (hereafter Office action).

(v) ***Summary of claimed subject matter -***

The invention is drawn to aspects of a coolant nozzle 20 (page 3, line 2).

Independent claim 1 identifies the nozzle in combination with a machine tool (page 3, line 3) and an elongate abrasive bit 22 carried by the machine tool (page 3, lines 2&3). The nozzle is identified as having a sintered body (line 2 of ¶0005 of page 1 and line 2 of ¶0019 of page 4). The body has at least one coolant inlet 62 (line 2 of ¶0017 of page 3). The body has a plurality of coolant outlets 80 (line 9 of ¶0017 of page 3). The outlets are distributed so that no gap in either circumferential direction between substantially adjacent ones of the outlets is more than 72° (72° being associated with the quantity of five outlets identified at line 4 of ¶0020 of page 4 with subsequent *ipsis verbis* antecedent basis having been added by amendment). Internal surface portions define one or more passageways (64, 72, 74) between the at least one coolant inlet and the at least one coolant outlet (lines 2-8 of ¶0017 of page 3). An aperture 50 accommodates the bit (line 14 of ¶0016 of page 3).

Dependent claim 2 identifies the sintered body as a single unitary piece (line 1 of ¶0019 of page 4) .

Dependent claim 3 identifies the passageways as including a plenum 72 surrounding the aperture (line 5 of ¶0017 of page 3).

Dependent claim 4 identifies the coolant outlets as symmetric around the axis 500 (line 3 of ¶0005 of page 1).

Dependent claim 5 identifies the outlets as directing coolant streams toward an axis of the bit (line 4 of ¶0005 of page 1 and the last two lines of page 3).

Dependent claim 6 identifies the outlets as elongate (e.g., line 1 of page 4).

Dependent claim 7 identifies there being at least five outlets and the inlet being a single inlet (line 6 of ¶0005 of page 1).

Dependent claim 8 identifies an aperture diameter of less than 3cm (*id*).

Independent claim 10 identifies the tool, bit, and nozzle as noted above relative to claim 1 without reference to the sintered structure. Claim 10 identifies the outlets as oriented to discharge associated cooling outlet streams to impact obliquely toward a tip of the bit along a side of the bit (last line of ¶0005 of page 1 and FIG. 5). Claim 10 identifies the gap of claim 1 and identifies

that there are no other coolant outlets in addition to those referenced (see last three lines of ¶0007). Claim 10 identifies the internal surface portions of claim 1.

Dependent claim 11 identifies the outlets at a common radial position relative to the axis and unique angular position (lines 1 and 2 of ¶0007 of page 2).

Dependent claim 13 identifies the nozzle as surrounding a full 360° of the aperture (line 4 of ¶0019 of page 4).

Dependent claim 14 identifies the outlets as angled to provide essentially total coverage along the length of an abrasive portion of the bit (fourth from last line of ¶0017 of page 4).

Dependent claim 15 identifies the outlets as providing a redundant coverage around the entire circumference of the bit so that, during a machining operation, the effects of the workpiece blocking one or more sprays 100 of the coolant are limited (last three lines of ¶0017 of page 4).

Independent claim 16 identifies a machine tool, rotating abrasive quill 22, and a nozzle 20 comprising a sintered body as noted above relative to claim 1 above. The body has at least one coolant inlet 67 and at least one coolant outlet 80. The outlet discharges a plurality of liquid coolant outlet streams impacting obliquely toward the tip of the quill along a side of the quill as in claim 10 above. Internal surface portions define one or more passageways along an essentially entire circumference of the quill between the at least one coolant inlet and the at least one coolant outlet and an aperture accommodates the quill as in claim 1 above.

Dependent claim 18 identifies a sintered ceramic (line 2 of ¶0019 of page 4) .

Dependent claim 19 identifies at least five outlets and a single coolant inlet.

Independent claim 20 identifies a machine tool, a rotating abrasive bit 22, and a nozzle 20 comprising a sintered body and having a through aperture 50 accommodating the bit, a coolant inlet 62, and a plurality of coolant outlets 80 as noted above relative to claim 1. The outlets are more than one angular position about the through aperture and oriented to discharge an associated coolant outlet streams 100 (line 2 of page 4) and having circumferential spacing between each of the outlets and associated first and second adjacent ones of the outlets on respective first and second sides of said outlet of no more than 72° as noted above relative to claim 1. Internal surface portions define one or more passageways between the coolant inlet and the plurality of coolant outlets as noted above relative to claim 1.

Dependent claim 20 identifies the bit as a superabrasive quill (line 2 of ¶0016 of page 3) .

Dependent claim 22 identifies the bit as having a doubly convex head 26 and a distal shaft portion 28 which have an abrasive coating for embedded abrasive particles (line 3 of ¶0016 of page 3).

Dependent claim 25 identifies the passageways as including a feed trunk 64 and a plenum 72 between the feed trunk and the outlets (lines 2-5 of ¶0017 of page 3).

Dependent claim 26 identifies the coolant outlet streams as having centerlines meeting the bit at an acute angle θ_2 to a rotational axis 500 of the bit (line 4 of page 4).

Grounds of rejection to be reviewed on appeal -

There are five (5) grounds of rejection to be reviewed on appeal as follows:

Ground 1 – The 35 U.S.C. 102 rejection of claims 10, 11, and 13-15 as being anticipated by DE 202 16 396.

Ground 2 – The 35 U.S.C. 103 rejection of claims 1-11 (believed 1-8, 10, and 11), 13-16, and 18-26 as being unpatentable over U.S. Patent 6,471,573 of Reitmeyer.

Ground 3 – The 35 U.S.C. 103 rejection of claims 10, 11, and 13-15 as being unpatentable over Reitmeyer in view of DE'396.

Ground 4 – The 35 U.S.C. 103 rejection of claims 1-9 (believed 1-8), 16, and 18-26 as being unpatentable over Reitmeyer in view of Perkins et al.

Ground 5 – The 35 U.S.C. 103 rejection of claims 1-9 (believed 1-8), 16, and 18-26 as being unpatentable over DE '396 in view of Perkins et al.

Ground 1 - Claims 10, 11, and 13-15 are not anticipated by DE 202 16 396.

Claim 10

Claim 10 identifies the presence of an elongate abrasive bit. There is no suggestion for DE '396 having such an elongate bit. DE '396 involves a polishing disk for polishing the edges of flat glass panels. Accordingly, DE '396 cannot anticipate claim 10. The assertion of an elongated bit totally vitiates the term and is unreasonably inconsistent with interpretation in the art.

A prior Office action isolated the non-abrasive shaft of the polishing disk and ignored the non-elongate polishing portion. Asserted elongatedness of the shaft was unreasonably asserted as an elongate bit. The final Office action at ¶3 of page 2, however, identifies the disk 14/16. This is repeated at ¶11 where it is asserted that the combined shaft and disk length is greater than the disk diameter. One of ordinary skill in the art would regard element 14, 16 as a disk and not reasonably as an elongate abrasive bit. There is no specific suggestion for use with an elongated tool and assertions of inherency are unsupported. It is unreasonable to assert the combination as an elongate bit. No sufficient explicit reason has been articulated for any further modification to use an elongate bit. The ¶11 assertion of possible use in a milling tool does not inherently disclose or suggest an elongate bit. A milling tool is not inherently elongated.

Claims 10 and 11

Although the FIG. 11/12 embodiment was cited against base claim 10, the two apparent groups of outlets 26' and 26" in DE'396 FIG. 12 are at different radial positions as shown in Ex. 1. This precludes both groups being applied to the claims and the "no other" element of claim 10 precludes the possibility that only one of these two groups is applied while the other is ignored. Accordingly, DE '396 all the more cannot anticipate claim 11.

The ¶11 assertion that the "no other" and "common radial position" elements could be satisfied by the 11/12 embodiment are wrong. Such interpretation involves selecting one group of outlets 26' or 26" and ignoring the other. The claim elements preclude such ignoring. In the final Office action, however, FIG. 8 also was cited as having a single group of outlets against claim 11. However, the disk 16 of that figure is clearly even more distinguished from an elongate bit as noted above.

Claim 14

The non-elongatedness of the DE'396 disk does not raise issues associated with an elongate bit. Thus, it does not disclose or suggest the lengthwise coverage of claim 14. For example, the angling of DE'396 may be selected merely for delivery and not for a longitudinal extent of coverage. If an elongate bit were inserted into the DE'396 nozzle, there is no indication that there would be the claimed coverage.

Claim 15

Again, the difference in situations between the polishing disk and an elongate bit highlights that DE'396 does not disclose or suggest the redundancy of coverage.

Ground 2 - Claims 1-11 (believed 1-8, 10, and 11), 13-16, and 18-26 are not unpatentable over U.S. Patent 6,471,573 of Reitmeyer

Claims 1, 10, 16, and 20

Reitmeyer discloses a nozzle attached to a die grinder-type apparatus. The nozzle appears to be a machined metallic assembly and has a small number of outlets in a small radial sector adjacent to the grinding bit (see Ex. 3). They are fed by a single straight bore/plenum shown at 28 and covering a correspondingly small sector. It does not disclose the claimed outlet distribution or coverage. For example, independent claims 1 and 10 specifically reference a minimum "gap" between outlets which is greatly exceeded by the large clear sector of Reitmeyer in which there is no coverage. Independent claim 20 similarly identifies a "spacing". Slightly

differently, independent claim 16 identifies the one or more passageways along essentially an entire circumference of the quill (e.g., an internal plenum feeding the outlets). Its dependent claim 19 identifies the at least five outlets which is the number associated with the angular separation of claims 1, 10, and 20.

In ¶5, in the sentence spanning pages 3 and 4, it was asserted that Reitmeyer recited "any desired number of such outlet ports... may be located in any desired positions..." However, the Office's position mistakenly treats this passage as if it had disclosed all numbers and positions of outlets. Clearly, Reitmeyer might enable some scope of variations beyond its particular illustrated embodiment. However, there is no suggestion that it would enable or otherwise render obvious the presently-claimed invention. For example, the particular machined assembly nature of Reitmeyer clearly mitigates against a full circumferential distribution. For example, how would the bore/plenum 28 feed all the outlets? A much more comprehensive reengineering would be required.

There is also no indication that a fuller circumferential distribution would not destroy the basic functionality of Reitmeyer. For example, Reitmeyer's bit may be exposed for grinding in the large sector opposite the group of three outlets. A full circumferential distribution would block this access of the workpiece to the bit.

It was asserted that the changed shape involves only routine skill in the art. There is no support for this erroneous statement. Furthermore, the citation to *In re Stevens* is irrelevant because *Stevens* does not support that proposition. *Stevens* dealt with an adjustable angle handgrip for a fishing rod. There is no support for the erroneous assertion that one would make the claimed shape changes merely based upon workpiece parameters. For example, there is no indication that the claim distribution would be within a range associated with a normal variation in workpiece parameters.

At ¶12, several errors were made. First, disagreement was taken with Appellants' characterization of the Office's position as Reitmeyer "discloses all numbers and positions" of outlets. Ignoring the substance, the Office asserted that the form of such a rejection would have been anticipation rather than obvious. Clearly, the substance remains erroneous (e.g., that Reitmeyer would suggest or otherwise render obvious all numbers and positions).

In that same paragraph, the hypothesized modification of "10 [outlets] in the same arrangement as disclosed... would meet the limitation of the outlets not being positioned more

than 72 degrees." However, this is clearly wrong. For example, a ten outlet configuration might just as well be achieved by using the same small sector but spacing the outlets circumferentially closer together. Alternatively, a slightly larger circumferential extent could be used. However, a more full circumferential array leaving no gap of more than 72° is clearly at odds with the manufacturing techniques, etc. of Reitmeyer as noted above. Such would require more than a routine experimentation.

Also, the more full circumferential nature of the present outlets is clearly a fundamental departure from what Reitmeyer pursued.

Claims 1, 16, and 20

Claims 1, 16, and 20 identify a sintered nozzle body. Dependent claim 18/16 further identifies the body as a sintered ceramic. The sintered structure is not disclosed or suggested by Reitmeyer. In the second full paragraph of page 4 of the Office action, it was asserted that:

"sintered body, is not germane to the issue of patentability of the device itself. However, sintering to make the device last longer and/or to protect it against corrosion, is known in the art and such modification would have been well within the knowledge of one of ordinary skill in the art."

This erroneous statement is without substantiation and citation. There is no indication that one of ordinary skill in the art would provide Reitmeyer with a sintered body (and none that Reitmeyer's structure would be sinterable), let alone that the sintered body would either make Reitmeyer last longer or protect it against corrosion in the Reitmeyer use (see Perkins et al. discussed below). If anything, the opposite would be the case. Where is the expectation of such properties for the Reitmeyer use (or any other use) found? There is further no suggestion for the sintered ceramic.

The argument in the first full paragraph of page 8 of the Office action is clearly hindsight. By what evidence is it asserted that a sintered body would have "higher strength" than the material Reitmeyer used? There is similarly no suggestion that it would be otherwise more durable and/or protect against corrosion (see Perkins et al. discussion below). This is totally hindsight. As is already in the record, the sintered material was selected by the present Appellants for advantageous manufacturing considerations in spite of structural weaknesses which would have been expected by one of ordinary skill in the art. There would have been no expectation of structural advantages, let alone those hypothesized.

As is discussed further below, the only cited basis for the asserted properties of sintering is Perkins et al. This is clearly distinguished below. There is no reasonable basis for asserting one of ordinary skill in the art would find a sintered body had advantageous properties relative to the apparently machined Reitmeyer body.

Claim 2

Claim 2 expressly identifies the body as being a single unitary piece. If the Board were, for some reason, to not give weight to the sintered body limitation discussed above, the single-piece limitation becomes relevant. There is no suggestion in Reitmeyer for this construction.

Claim 3

Claim 3 identifies a plenum surrounding the aperture. Clearly, the straight plenum/bore 28 does not surround by any reasonable definition.

Claim 4

As noted above, the clearly asymmetric Reitmeyer situation does not give one reason to adopt a symmetric situation.

Claim 7

This claim identifies at least five outlets and a single inlet. The five outlets element is believed redundant with claim 1 but was left in because earlier interpretations by the Office failed to properly weigh the identification of "no gap... being more than 72°" Accordingly, it is believed patentable for the same reason as claim 1 but may become relevant if the Office revisits its interpretation.

Claim 13

As noted above, the limited sector of the reference does not suggest the full 360° extent.

Claims 15 and 16

Reitmeyer's FIG. 4 clearly shows that it is not the particular workpiece configuration that keeps Reitmeyer's coverage to a small non-redundant circumferential extent. No part of the workpiece is shown blocking the remaining area of the circumference. Thus, there is not the particular redundant coverage of claim 15 ("around the entire circumference") or the general redundant coverage of claim 16 (identifying "passageways along essentially an entire circumference of the quill...") because there is a large sector not addressed by any of Reitmeyer's sprays (claim 15) and the plenum 28 extends only along a small sector (claim 16).

Claim 18

Regarding claim 18 (erroneously asserted as 19), the Office action cited *In re Leshin*. However, *Leshin* is inapposite. *Leshin* involved a claim to a molded plastic container. Although one reference was a metal container, a second reference was plastic: "...Anderson shows a similar container of molded plastic and applicant concedes that the plastics he uses are well known..." 125 USPQ 417. In the present case, there is no similar sintered coolant nozzle to that presently claimed. There is no suggestion that one of ordinary skill in the art to which the present invention most closely pertains would have selected a sintered material generally, or a sintered ceramic particularly. There is no basis for asserting that the material has known or otherwise obvious suitability and is within the reasonable domain of design choice. No reason is found and none has been explicitly articulated. Only partial articulation is found relative to Perkins et al. discussed below.

Claim 21

Claims 21 and 22 further define the bit as a quill and identify properties thereof. Claim 21 uses the term "superabrasive quill". Claim 22, on the other hand, also depends from claim 20 and identifies "a doubly convex head portion and a distal shaft portion which have an abrasive coating or embedded abrasive particles." In the paragraph spanning pages 8 and 9, it was asserted that the Reitmeyer bit discloses an abrasive quill. However, this vitiates the distinction between the generic term bit and the claimed "elongate superabrasive quill". That paragraph erroneously identifies claim 22 instead of claim 21 as identifying the term "superabrasive quill". The terms "superabrasive" and "quill" and their combination are terms of art which would not be reasonably regarded as describing the die grinding bit of Reitmeyer.

In the third full paragraph of page 4, the Office action further bootstraps a previously made argument. There is no indication that Reitmeyer discloses the use of an element superabrasive bit.

Reitmeyer's die grinding bit would not reasonably be regarded as a quill.

Claim 22

In that same paragraph spanning pages 8&9, it was erroneously recited that claim 22 did not recite structure to read over Reitmeyer. Although the generic reference to superabrasive quill is believed to read over as one of ordinary skill in the art would understand, the particular claim 22 reference to doubly convex head portion and distal shaft portion having an abrasive coating or

embedded abrasive particles distinguishes Reitmeyer. The prior art fails to suggest the nozzle in combination with such a quill.

Ground 3 - Claims 10, 11, and 13-15 are not unpatentable over Reitmeyer in view of DE'396

This is merely a hindsight reconstruction of the present invention. The arguments above regarding the asserted obviousness of outlet distribution also apply here. Furthermore, this rejection further highlights the impropriety of that rejection. The attempted modification of Reitmeyer, if possible, would greatly increase Reitmeyer's already high complexity and manufacturing cost. This is evidenced by the number of parts and machining steps required just to provide the three outlets of Reitmeyer. It would have to be absurdly complex to implement the outlet distribution of DE'396 in the Reitmeyer nozzle. The ¶13 asserted "motivation provided at least by the base reference" is clearly improper. The base reference does not teach (or give other reason to adopt) so extreme a modification of its own embodiment. If anything, it teaches away therefrom. This further confirms the non-obviousness of the present invention.

This is not merely a case of applying a recent development already used to modify one similar device to similarly modify another. "Applying modern electronics to older mechanical devices has been commonplace in recent years." *Leapfrog Enterprises Inc. v. Fisher-Price Inc.*, ___ F.3d ___, ___, 82 USPQ2d 1687, 1691 (Fed. Cir. 2007). "There then was a marketplace creating a strong incentive to convert mechanical pedals to electronic pedals, and the prior art taught a number of methods for doing so." *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, ___, 127 SCt 1727, ___, 167 LEd2d 705, ___, 82 USPQ2d 1385, 1390 (U.S. 2007).

The present case is clearly distinguished for example from that of *KSR* and *Leapfrog*. The present inventors have not simply modified one nozzle in a similar way to which the recent prior art has modified similar nozzles. To a great extent, *KSR* and *Leapfrog* deal with obvious subject matter wherein the obviousness arose too recently for a convenient anticipatory reference to be found. Neither reference represents a recent background change in technology as in the automation trends of *KSR* and *Leapfrog*. If there was a reason to have made the modification, it would have been made (e.g., in lieu of the actual configurations of the references).

Ground 4 - Claims 1-9 (believed 1-8), 16, and 18-26 are not unpatentable over Reitmeyer in view of U.S. Patent 4,252,768 of Perkins et al.

Claims 1, 10, 16, and 20

Perkins et al. is asserted only for material and therefore does not cure the Ground 2 rejection based only upon Reitmeyer. It, for example, does not cure the deficiencies regarding the outlet distributions of independent claims 1, 10, 16, and 20 and their dependent claims. Oddly, the "sintered body, number of outlets, the size, and the types of the bit" were asserted in ¶7 as obvious modifications "in view of Perkins et al. and depending on the intended use, workpiece/operational parameters..." This is odd because Perkins et al. discloses a single outlet sandblasting nozzle rather than a multi-outlet coolant nozzle used with a bit.

Claim 2

Perkins et al. does not cure Reitmeyer's lack of the claim 2 single piece structure

Claim 3

Perkins et al. does not cure Reitmeyer's lack of the claim 3 plenum.

Claim 4

Perkins et al. does not cure Reitmeyer's lack of the claim 4 symmetry.

Claim 7

Perkins et al. does not cure Reitmeyer's lack of the claim outlet count.

Claim 16

Perkins et al. does not cure Reitmeyer's lack of the claim 16 coverage.

Claim 21

Perkins et al. does not cure Reitmeyer's lack of the claim 21 quill.

Claim 22

Perkins et al. does not cure Reitmeyer's lack of the claim 22 bit structure.

Claim 25

Perkins et al. does not cure Reitmeyer's lack of the claim 25 plenum and trunk structure.

Claims 1, 16, and 20

Claims 1, 16, and 20 and their dependent claims identify a sintered nozzle body.

Dependent claim 18/16 further identifies the body as a sintered ceramic. Perkins et al. discloses a very specific construction of a sandblasting nozzle. The Perkins et al. nozzle has a core and a separate casing. The core material is a ceramic composite having a composition selected for

properties including high temperature oxidation resistance, high strength, high abrasion resistance, high resistance to thermal shock, and the like. Col. 3, lines 26-63. The Perkins et al. delivery of a high temperature sandblasting medium is substantially different from both the Reitmeyer nozzle on the one hand and the present coolant nozzle on the other hand. There has been no properly cited motivation as to why one of ordinary skill in the art would so modify Reitmeyer or otherwise attempt sintered material use in a coolant nozzle.

There is no suggestion for the proposed combination. This is merely a hindsight reconstruction. There is no suggestion that one of ordinary skill in the art would seek Perkins et al. or, if presented with Perkins et al. choose any modification based thereon. Perkins et al. involves considerations particular to sandblasting nozzles and not coolant nozzles. The ceramic core of Perkins et al. appears chosen for interfacing with the sandblasting medium which requires abrasion resistance and high temperature resistance. There is no suggestion that these properties are more desirable for coolant use of Reitmeyer than are Retimeyer's materials. There is no suggestion to use it for coolant.

There is furthermore no suggestion that one, if using Perkins et al., would make the claimed nozzle as a single piece. For example, if molded, one would effectively duplicate the multiple pieces of Reitmeyer with multiple ceramic pieces, potentially needing further housing structure to hold them together. There is no indication that the single piece nature of the Perkins et al. core (as distinguished from the nozzle of Reitmeyer) would be preserved in making more complex structure.

At ¶14, the Office action cites *In re McLaughlin*. However, the examiner clearly obtained Perkins et al. based upon hindsight in view of Appellants' own disclosure. For example, the present application has search subclasses within classes 408, 409, and 451 whereas Perkins et al. is classified under 264 and 501. Clearly, Perkins et al. arose purely from a hindsight keyword search. No motivation or other reason has been suggested as to why someone in the cooling nozzle art would go to the sandblasting nozzle art. The assertion that "Perkins et al. clearly teaches using sintered ceramic for durability and/or to protect against corrosion" is, even if correct, limited to the sandblasting art and does not suggest advantageous performance in the cooling nozzle art. Because these are different arts and different physical situations/problems, there is no reason to combine.

KSR and *Leapfrog*. are distinguished as noted above relative to Ground 3.

Furthermore, the present secondary reference Perkins et al. is clearly nonanalogous to the primary reference. This is clearly different from *KSR* and *Leapfrog*, wherein similar modifications are found in analogous references for analogous purposes. The Perkins et al. use in high temperature sandblasting is not properly analogized to the cited coolant nozzles or the present nozzle.

The present secondary reference (more particularly the elements/teachings for which it is cited) is also not particularly recent (1981). Thus, the art has had more than sufficient time to have adopted those elements/teachings but has not done so. The Office action did not identify a recently-arisen prior art need that would similarly give reason for the modification.

Ground 5- Claims 1-9 (believed 1-8), 16, and 18-26 are not unpatentable over DE '396 in view of Perkins et al.

This rejection suffers from the same deficiencies as do the underlying DE '396 rejection and the Reitmeyer in view of Perkins et al. rejection of Ground 1. As noted above relative to Ground 4, Perkins et al. is only asserted for material and thereby, does not cure the failure of DE'396 to disclose additional elements.

Claim 8

Perkins et al. does not cure DE '396's lack of the claim 8 size.

Claim 16

Perkins et al. does not cure DE '396's lack of the claim 16 quill.

Claim 21

Perkins et al. does not cure DE '396's lack of the claim 21 quill.

Claim 22

Perkins et al. does not cure DE '396's lack of the claim 22 bit structure.

Claim 25

Perkins et al. does not cure DE '396's lack of the claim 25 plenum and trunk structure.

Claim 25

Perkins et al. does not cure DE '396's lack of the claim 26 angles.

Claims 1, 16, and 20

Claims 1, 16, and 20 and their dependent claims identify a sintered nozzle body.

Dependent claim 18/16 further identifies the body as a sintered ceramic.

It was merely asserted that "DE '396...in view of Perkins et al. further modified in light of combination with known tools, depending on the intended use, as indicated above meets all the limitations." Again, this is thoroughly conclusory and without support. As with the other obviousness rejections, there is a substantial degree of bootstrapping in first unsupportably proposing a combination that yields a portion of the invention and then vaguely asserting optimization for what is a non-obvious use (in lieu of a proper suggestion for the remaining elements). The nonobviousness of modifying a coolant nozzle based upon Perkins et al is as noted above relative to Ground 4.

Claim 2

Even if proper, the combination would presumably have the Perkins et al. 2-piece structure, not the claim 2 single piece.

Conclusion

Each of the claims as set forth above clearly contains allowable subject matter. It is respectfully submitted that these rejections are in error.

Reversal of the rejection of these claims is therefore earnestly solicited.

(viii) *Claims appendix* - Attached is a Claims appendix containing all claims in the application and which form the basis for this appeal.

(ix) *Evidence appendix* - Attached is an Evidence appendix showing relevant drawing figures of the cited references.

(x) *Related proceedings appendix* - None.

Appellants request that the fee for filing this Appeal Brief and the fee for a one-month extension of time (which Appellants hereby request) be charged to Deposit Account No. 21-0279. Please charge any deficiencies or additional fees which may be required hereunder and credit any overpayments to Deposit Account No. 21-0279.

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Respectfully submitted,

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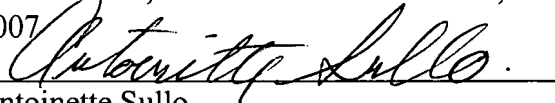
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Antoinette Sullo

Claims Appendix

Listing of Claims:

1. An apparatus comprising:
a machine tool;
an elongate abrasive bit carried by the machine tool; and
a nozzle, the nozzle comprising a sintered body having:
at least one coolant inlet;
a plurality of coolant outlets, no gap in either circumferential direction between sequentially adjacent ones of the outlets being more than 72°;
internal surface portions defining one or more passageways between the at least one coolant inlet the and at least one coolant outlet; and
an aperture accommodating the bit.
2. The apparatus of claim 1 wherein the sintered body is a single unitary piece.
3. The apparatus of claim 1 wherein the one or more passageways includes a plenum surrounding the aperture.
4. The apparatus of claim 1 wherein the plurality of coolant outlets are symmetric around an axis.
5. The apparatus of claim 1 wherein the plurality of coolant outlets are positioned to direct associated coolant outlet streams toward an axis of the bit when said bit is in an installed position.
6. The apparatus of claim 5 wherein the plurality of coolant outlets are elongate.
7. The apparatus of claim 5 wherein the plurality of coolant outlets comprises at least five outlets and the at least one coolant inlet is a single coolant inlet.

8. The apparatus of claim 1 wherein the aperture has a diameter of less than 3cm.
9. (Canceled)
10. An apparatus comprising:
 - a machine tool;
 - an elongate abrasive bit carried by the machine tool; and
 - a nozzle, the nozzle comprising:
 - a through-aperture accommodating the bit;
 - a coolant inlet;
 - a plurality of coolant outlets at more than one angular position about the through-aperture and oriented to discharge associated coolant outlet streams to impact obliquely toward a tip of the bit along a side of the bit, no gap in either circumferential direction between sequentially adjacent ones of the outlets being more than 72°, there being no other coolant outlets in addition to the plurality of coolant outlets; and
 - internal surface portions defining one or more passageways between the coolant inlet and the plurality of coolant outlets.
11. The apparatus of claim 10 wherein the plurality of coolant outlets are each at a common radial position relative to an axis and are each at a unique angular position about said axis.
12. (Canceled)
13. The apparatus of claim 10 wherein the nozzle surrounds a full 360° of the through-aperture.
14. The apparatus of claim 1 wherein the plurality of coolant outlets are angled to provide essentially total coverage along a length of an abrasive portion of the bit.
15. The apparatus of claim 1 wherein the plurality of coolant outlets provide a redundant coverage around the entire circumference of the bit so that, during a machining operation, the

effects of a workpiece blocking one or more sprays of the coolant are limited.

16. An apparatus comprising:

a machine tool;

a rotating abrasive quill carried by the machine tool; and

a nozzle, the nozzle comprising a sintered body and having:

at least one coolant inlet;

at least one coolant outlet discharging a plurality of liquid coolant outlet streams impacting obliquely toward a tip of the quill along a side of the quill;

internal surface portions defining one or more passageways along essentially an entire circumference of the quill between the at least one coolant inlet and the at least one coolant outlet; and

an aperture accommodating the quill.

17. (Canceled)

18. The apparatus of claim 16 formed of a sintered ceramic.

19. The apparatus of claim 16 wherein the at least one coolant outlet comprises at least five outlets and the at least one coolant inlet is a single coolant inlet.

20. An apparatus comprising:

a machine tool;

a rotating abrasive bit carried by the machine tool; and

a nozzle, the nozzle comprising a sintered body and having:

a through-aperture accommodating the bit;

a coolant inlet;

a plurality of coolant outlets at more than one angular position about the through-aperture and oriented to discharge associated coolant outlet streams and having circumferential spacing between each of the outlets and an associated first and second adjacent ones of the outlets on respective first and second sides of said outlet of no more than 72°; and

internal surface portions defining one or more passageways between the coolant inlet the and the plurality of coolant outlets.

21. The apparatus of claim 20 wherein the bit is an elongate superabrasive quill.
22. The apparatus of claim 20 wherein the bit has a doubly convex head portion and a distal shaft portion which have an abrasive coating or embedded abrasive particles.
23. The apparatus of claim 20 having a sintered nozzle body.
24. The apparatus of claim 1 wherein the coolant is water based or comprises oil.
25. The apparatus of claim 1 wherein the one or more passageways include:
 - a feed trunk; and
 - a plenum between the feed trunk and the outlets.
26. The apparatus of claim 16 wherein the liquid coolant outlet streams have centerlines meeting the bit at an acute angle to a rotational axis of the bit.

Evidence Appendix

Ex. 1

Annotated FIG. 12 of DE '396

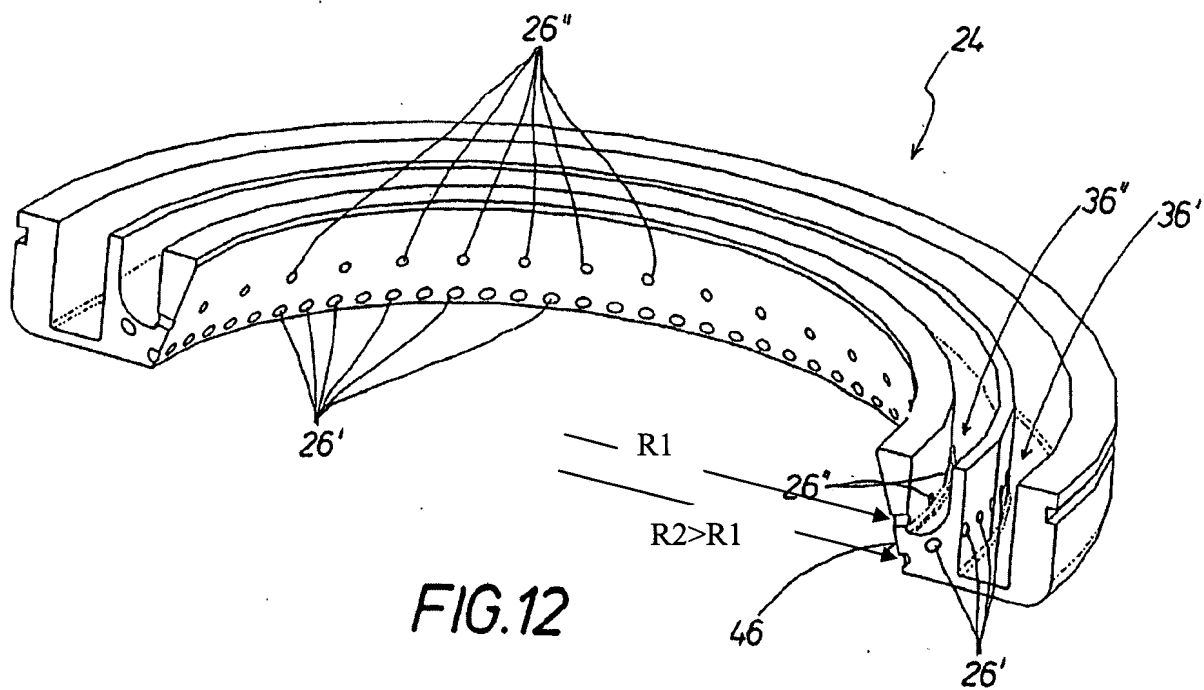
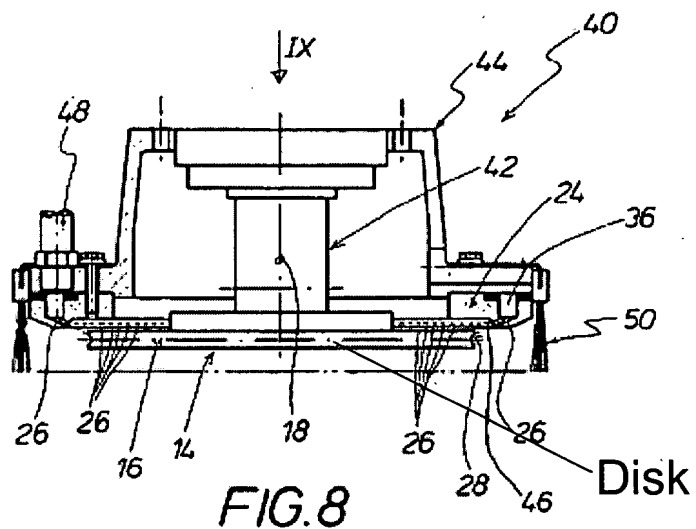


FIG.12

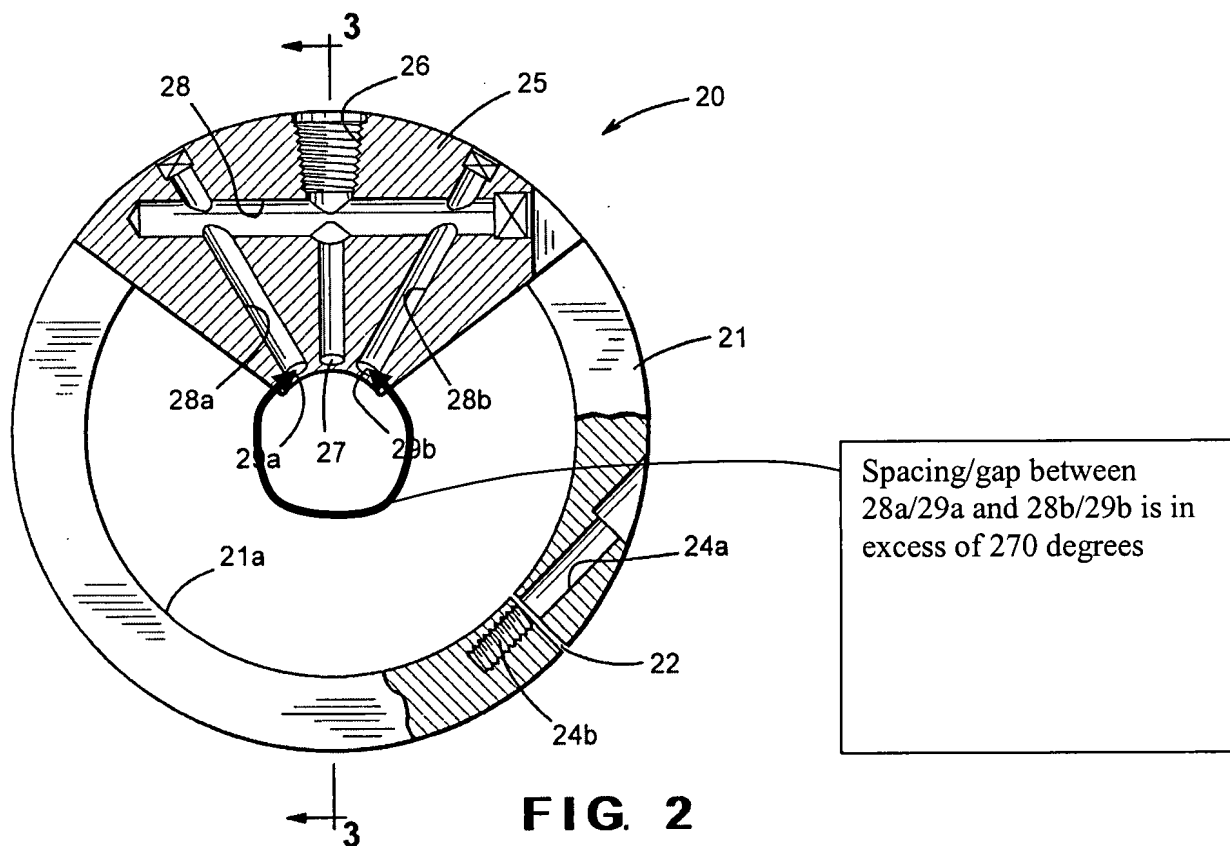
Ex. 2

Annotated FIG. 8 of DE '396



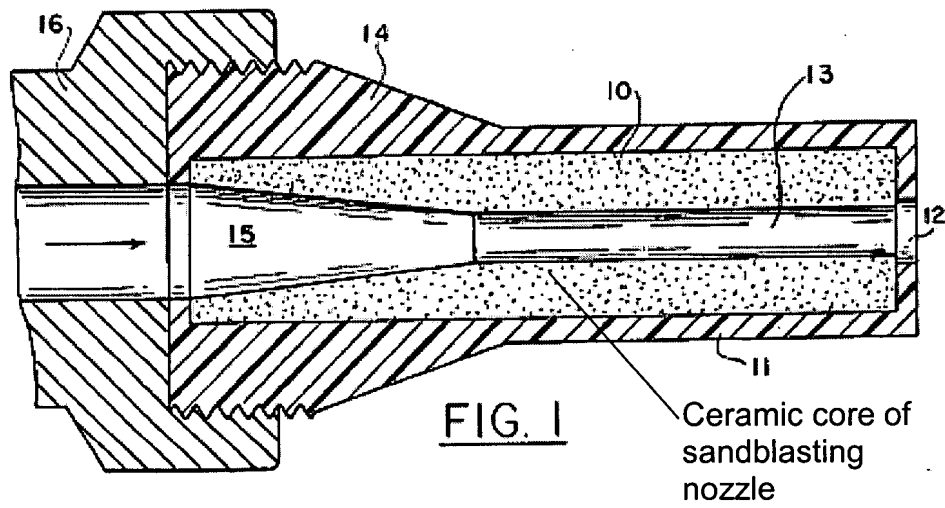
Ex. 3

Annotated FIG. 2 of Reitmeyer



Ex. 4

Annotated FIG. 1 of Perkins et al.



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Related Proceedings Appendix

None